ESTO-funded Sensor Web Technology Goes Inside a Volcano, Monitors Activity

Scientists In a collaborative effort between USGS, NASA, and Washington State University Vancouver, high-tech "spider" pods were placed inside and around the mouth of Mount St. Helens to create a network that could one day be used to respond rapidly to an impending eruption. The fifteen pods form a virtual wireless network, communicating with each other and the Earth Observing-1 (EO-1) satellite, which can be triggered to take observations from space.

"This project demonstrates that a low-cost sensor network system can support real-time monitoring in extremely challenging environments," said WenZhan Song of Washington State University Vancouver. Song is the principal investigator for an AIST-funded project tasked with developing the autonomous networking software.

The spiders were built to operate in extreme temperatures and treacherous terrain. Each pod contains a seismometer to detect earthquakes; a GPS receiver to pinpoint the exact location and measure subtle ground deformation; an infrared sounder to sense volcanic explosions; and a lightning detector to search for ash cloud formation. The main instrument box is the size and shape of a microwave oven. It sits on top of a three-legged tripod, which is why scientists call them spiders. The pods are powered by batteries that can last for at least a year.

The network of pods can supply long-term data without endangering researchers as well as quickly provide valuable real-time information to emergency services in the event of an eruption. "We hope this network will provide a blueprint for future networks to be installed on many of the world's unmonitored active volcanoes," said Sharon Kedar of the Jet Propulsion Laboratory.

This work is one of several AIST-funded projects that are developing sensor webs to provide timely data and analyses for scientific research, natural disaster mitigation, and the exploration of hazardous environments.

For more information on Volcano sensor networks, visit: ai.jpl.nasa.gov/public/projects/sensorweb/

For more information on emerging technologies for Earth science, visit the ESTO website at: esto.nasa.gov

Sensors like this are being placed inside and around the mouth of Mount St. Helens. These "spider' pods may someday be called upon for real-time information about an impending eruption.